Tularemia Outbreak Associated with Outdoor Exposure on the West Side of Utah Lake, June–July 2007

After-Action Report

Prepared by the Utah Department of Health, Bureau of Epidemiology

I. Background

The Utah Department of Health (UDOH), Utah County Health Department (UCHD), Salt Lake Valley Health Department (SLVHD), Weber-Morgan Health Department (WMHD), Davis County Health Department (DCHD), Southwest Utah Public Health Department (SWUPH), Utah Public Health Laboratory (UPHL), Primary Children's Medical Center (PCMC), Centers for Disease Control and Prevention (CDC, Division of Vector Borne Infectious Diseases, Fort Collins, Colorado), and Utah Division of Wildlife Resources investigated a tularemia cluster associated with outdoor exposure on the west side of Utah Lake between June 13 and July 3, 2007.

A. Key facts about tularemia

Tularemia is a zoonotic disease caused by the bacterium *Francisella tularensis*, which is a gram-negative coccobacillus that infects vertebrates (especially rodents, rabbits, and hares). About 200 human cases of tularemia are reported each year in the United States, with most cases occurring in the south-central and western states in rural areas (1). During 1992–2006, a mean of 2.5 cases per year (range 0–5) were reported to UDOH. Transmission occurs through arthropod bites (especially ticks and deerflies), ingestion of contaminated food or water, inhalation of contaminated aerosols, and handling of infected animal tissues (2). Previous cases of tularemia in Utah have been associated with hunting without appropriate protection against tick and fly bites and skinning animals, especially rabbits. Tularemia is not known to spread from person to person, so patients do not need to be isolated.

F. tularensis has a low infectious dose; a small number of bacteria (10–50 organisms) can cause disease. Incubation is usually 3–5 days, but can range from 1–14 days. The American Academy of Pediatrics 2003 Report of the Committee on Infectious Diseases Red Book lists an incubation period of 1–21 days. Clinical signs and symptoms vary based on the route by which infection was acquired. These include:

- Ulceroglandular: cutaneous ulcer with regional lymphadenopathy
- Glandular: regional lymphadenopathy with no ulcer
- Oculoglandular: conjunctivitis with preauricular lymphadenopathy
- Oropharyngeal: stomatitis or pharyngitis or tonsillitis and cervical lymphadenopathy
- Intestinal: intestinal pain, vomiting, and diarrhea
- Pneumonic: primary or secondary pleuropulmonary disease
- Typhoidal: febrile illness without early localizing signs and symptoms

Tularemia can be fatal if the patient is not treated with appropriate antibiotics.

The Centers for Disease Control and Prevention (CDC) classifies *F. tularensis* as a Category A Bioterrorism Agent because of the potential for easy dissemination, high mortality or public health impact, and public panic and social disruption. If used as a biological weapon, the bacteria would likely be made airborne for exposure by inhalation; people who inhale an infectious aerosol would generally experience severe respiratory illness, including life-threatening pneumonia and systemic infection, if they are not treated (1).

B. Outbreak Timeline

On July 12, 2007, the Utah Department of Health (UDOH) was notified by a Salt Lake County resident of a group of Salt Lake County residents who had all attended an outdoor event at a lodge on the west side of Utah Lake, had "bug bites" and subsequently became ill, and had been to Cottonwood Hospital or Primary Children's Medical Center (PCMC). UDOH notified Salt Lake Valley Health Department (SLVHD). On July 13, PCMC contacted SLVHD with report of a child who had a mysterious lesion that looked like a spider bite. That same day, Cottonwood Hospital notified SLVHD of a patient with similar signs and symptoms; SLVHD investigated and found that this patient had traveled to the west side of Utah Lake. A conference call between SLVHD, PCMC, and UDOH was immediately convened. Utah Notification and Information System (UNIS) and Epi-Xchange alerts were sent, and a working case definition was established. UDOH issued a press release on July 13. SLVHD began collecting samples from suspect case patients. Local emergency departments, urgent care centers, and Utah Poison Control were alerted of the potential outbreak among visitors to the west side of Utah Lake, provided clinical information about tularemia, and asked to notify the health department immediately with any suspect cases. On July 16, additional suspect cases were identified from Salt Lake County and Utah County. On July 18 and 20, conference calls with UDOH, the Utah Division of Wildlife Resources, and local health departments were convened, with CDC Fort Collins also in attendance and offering assistance. Active surveillance was occurring at this time. An investigation was initiated to identify risk factors and protective factors regarding tularemia and to identify potential subclinical or unrecognized infections among exposed individuals. CDC Fort Collins conducted an environmental assessment from July 26–28. Later, a clinical study was conducted to characterize disease among confirmed patients.

II. Methods

The outbreak investigation had three components:

1. Environmental Assessment: CDC Fort Collins assessed the area of the lodge by collecting animal and insect specimens and looking for other evidence of a rabbit die-off. Objective: Identify the presence of tularemia in non-human species and identify all possible routes of transmission.
2. Cohort Study: Partners developed and distributed a questionnaire to assess exposures, risk factors, protective factors, and disease symptoms. Objective: Identify risk factors and protective factors for tularemia and identify potential subclinical or unrecognized infections among potentially exposed individuals.
3. Clinical Study: In addition to the cohort study questionnaire, case patients completed a clinical questionnaire. These data, along with laboratory and medical records data, were used in the clinical study, which was lead by SLVHD and PCMC. Objective: Characterize disease diagnosis, symptoms, and progression.

This report will focus on the cohort study. Partners in this investigation plan to publish a peer-reviewed manuscript on each of the three components.

A. Case definitions

A confirmed case was defined as illness in a person that met confirmatory laboratory criteria and the epidemiologic criterion. A probable case was defined as illness in a person that met presumptive laboratory criteria and the epidemiologic criterion. A suspect case was defined as illness in a person that met the epidemiologic criterion but did not meet the laboratory criteria and did not have an alternative diagnosis that explained the clinical illness. A case would have fever (>100F) and could have any of the following presentations: ulceroglandular, glandular, oculoglandular, oropharyngeal, intestinal, pneumonic, or typhoidal. A case would have onset of illness June 14–July 17, 2007.

Laboratory criteria for diagnosis:

Presumptive

- Elevated serum antibody titer(s) to *F. tularensis* antigen (without documented fourfold or greater change) in a patient with no history of tularemia vaccination;
- Detection of *F. tularensis* in a clinical specimen by fluorescent assay; or
- Detection of *F. tularensis* DNA by appropriately validated PCR.

Confirmatory

- Isolation of *F. tularensis* in a clinical specimen; or
- Fourfold or greater change in serum antibody titer to *F. tularensis* antigen.

Epidemiologic Criteria:

A history of participating in an outdoor activity (e.g. pioneer trekking, camping, or hiking, hunting, or fishing) near the west side of Utah Lake within 14 days of illness onset.

B. Case identification

UPHL tested patient whole blood, serum, or wound cultures either drawn by the local health department or referred from a private laboratory to determine case status. Local public health officials initially conducted case investigation interviews with all confirmed, probable, and suspect patients using the UDOH Tularemia Case Report Form (Appendix B). Information collected included: signs and symptoms, onset date, treatment, testing performed, contact with animals, insect bites, exposure at or around Utah Lake, and questions related to bioterrorism. Confirmed and probable cases were also administered the outbreak-specific clinical questionnaire (Appendix D) for more detailed information on symptoms, treatment, and testing performed.

C. Data Collection

1. Cohort Study:

The target populations for this study were organized groups with the Church of Jesus Christ of Latter-Day Saints, with at least one confirmed, probable, or suspect case of tularemia, who attended an event at Mosida Lodge on the west side of Utah Lake between June 13 and July 3, 2007. Parental consent was requested for participants less than 18 years of age. A parent or guardian completed the questionnaire for participants less than 12 years of age.

A questionnaire concerning activities and animal exposures while staying at the lodge was created (see Appendix C). CDC Fort Collins assisted with creating the web-based version of the questionnaire. Representatives from the Church of Jesus Christ of Latter-Day Saints (i.e. ward Bishops and/or adult leaders for the church groups that visited Mosida Lodge) were contacted to help determine the best approach to recruiting the participants in the study. Several methods for contacting the possible participants were used:

a. A meeting was set up for an epidemiologist to attend a church meeting, explain the importance of the study, and distribute paper questionnaires. Questionnaires with instructions and/or instructions to use the web-based questionnaire were given to parents or other church members for persons who did not attend this meeting.
b. Paper questionnaires were mailed to potential participants along with instructions on how to use the web-based questionnaire.
c. The potential participant was called and was requested to provide an email address to use to send instructions for the web-based questionnaire.

Potential participants who did not respond to any method above were contacted by mail or telephone to try to gain participation.

Participants who indicated illness within the incubation period of tularemia (14 days) were contacted to determine if they sought medical attention. If they did, records were requested to evaluate whether they might have had tularemia. All participants who reported symptoms compatible with tularemia and lasting at least 3 days were offered serology at a time at least 4 weeks after illness onset.

Data from paper questionnaires were entered into the web-based system by UDOH staff. The same system captured data from the web-based questionnaire. All data from the web-based system was downloaded to a secure database. All analyses were performed using SAS version 9.1 (SAS Institute Inc., Cary, NC, USA).

2. Laboratory Investigation

UPHL tested all samples, following the Centers for Disease Control and Prevention laboratory criteria for confirming results. The specimens requested and collected were as follows:

1. Whole blood for PCR
2. Serum for serology
3. Wound swab (or aspirate) on dacron or rayon (non-wooded shafted) in a sealed, sterile tube
4. Second swab in bacterial culture media for culture

Upon receipt of the patient specimens, UPHL microbiology staff performed testing following Laboratory Response Network protocols. Because tularemia is a possible bioterrorism agent, UPHL cannot disclose their specific testing methodologies.

3. Environmental Assessment

Deer flies were collected by net as they alighted on vehicles and field personnel. Flies were identified to species and tested for *F. tularensis* using standard PCR and culture.

Trap lines with a total of 150 baited rodents traps (Sherman and Tomahawk) were set for two consecutive nights. Trapped animals were euthanized, and samples of blood and spleen were collected and transported on dry ice. The area around the lodge was searched for dead animals. DNA extracted from the bone marrow of animals found dead using the QIAamp DNA MiniKit (Qiagen, Valencia, CA, USA). Extracted DNA was amplified using a standard PCR assay for *F. tularensis* and a real-time, multitarget PCR that distinguished type A and type B strains.(2, 3)

III. Results

A. Cohort study

Fourteen cases of tularemia were identified with illness onset dates from June 15-July 5, 2007, with the largest number of cases occurring during the week of July 1 (Figure 1 and Appendix A). Nine of these cases were laboratory-confirmed, three were probable cases, and two were suspect cases. All cases, by definition, participated in outdoor activities on the west side of Utah Lake during their exposure period. No other cases of tularemia were reported in Utah during this time period. Case reports and active surveillance identified all 14 cases; no other cases were identified through the cohort study.

Case patients resided in five of Utah's 12 health districts. Patient's ages ranged from 1–77 years (median 19 years; mean 30.3+/-22.7 years). Eight (57.1%) patients were male, and six (42.9%) were female. Six (42.9%) patients required hospitalization, including four males and two females aged 7-49 years. CDC, Fort Collins completed biochemical biotyping or subtyping PCR on isolates from 11 patients, and all 11

showed infections caused by *F. tularensis* subsp. *tularensis* (type A). Five of the Type A isolates were further subtyped; three were Type A1 and two were Type A2. (See clinical report for more information.)

Questionnaires were completed for 448 (61%) of 738 eligible participants, including 14 who had been diagnosed with tularemia. Respondents' ages ranged from <1-80 years (median 17 years; mean 26.3+/-18.3 years); 229 (51.1%) were male and 219 (48.8%) were female. Case patients did not differ from non-case patients with regard to age or sex ($p>0.05$; data not presented).

Case patients were more likely to report insect bites (RR= 13.2, 95% confidence interval (CI) 1.7-100.3) and especially painful insect bites (RR= 4.2, 95% CI 1.5-12.1) while at the lodge (table 1). Seven (50.0%) of 14 case patients recalled an antecedent deer fly bite, as compared with 36 (8.3%) of 434 non-case patients (RR= 9.4, 95% CI 3.5-25.6). Non-case patients were more likely than case patients to recall a mosquito bite (42.6% versus 35.7%, respectively) or tick bite (0.2% versus 0.0%, respectively), but these differences were not statistically significant. There were also no statistically significant differences between case patients and non-case patients with regard to gnat, horsefly, other biting fly, wasp, ant, or spider bites ($p>0.05$; data not presented).

Case patients were more likely than non-case patients to report having used insect repellent (78.6% versus 68.0%, respectively) and DEET repellent specifically (78.6% versus 54.8%, respectively), but these differences were not statistically significant. Case patients were more likely than non-case patients to report having used insect repellent at night (42.9% versus 16.8%, respectively). Few cohort study respondents reported use of permethrin (9 (2.0%)) or picaridin (16 (3.6%)) (data not presented).

Specific areas of the grounds at the lodge were investigated as potential areas of risk for insect bites or contact with animals. Case patients were more likely than non-case patients to report having spent time near the hay barn (50.0% versus 21.2%, respectively; RR= 3.5, 95% CI 1.3-9.8).

Of those case patients who did not report deer fly bites (n=7), 6 (85.7%) recalled insect bites but did not know what insect(s) bit them and 1 (14.3%) could not recall having been bit or not. Mosquito bites, other biting fly bites, and having spent time near the hay barn were each named by one case patient who did not remember having been bitten by a deer fly. None of these case patients reported touching wild animals, dogs, or horses.

Case patients did not differ from non-case patients with regard to number of days spent at the lodge, where they had slept while at the lodge, activities participated in (volleyball, horseshoes, exploring trails, square dancing, or visiting the dairy), type of clothing worn (long or short sleeve shirts, long or short pants, or light or dark colored shirts and pants), contact with animals, or having seen live or dead rabbits ($p>0.05$; data not presented). Of all respondents, 112 (25.0%) reported having seen live rabbits and 113 (25.2%) reported having seen dead rabbits.

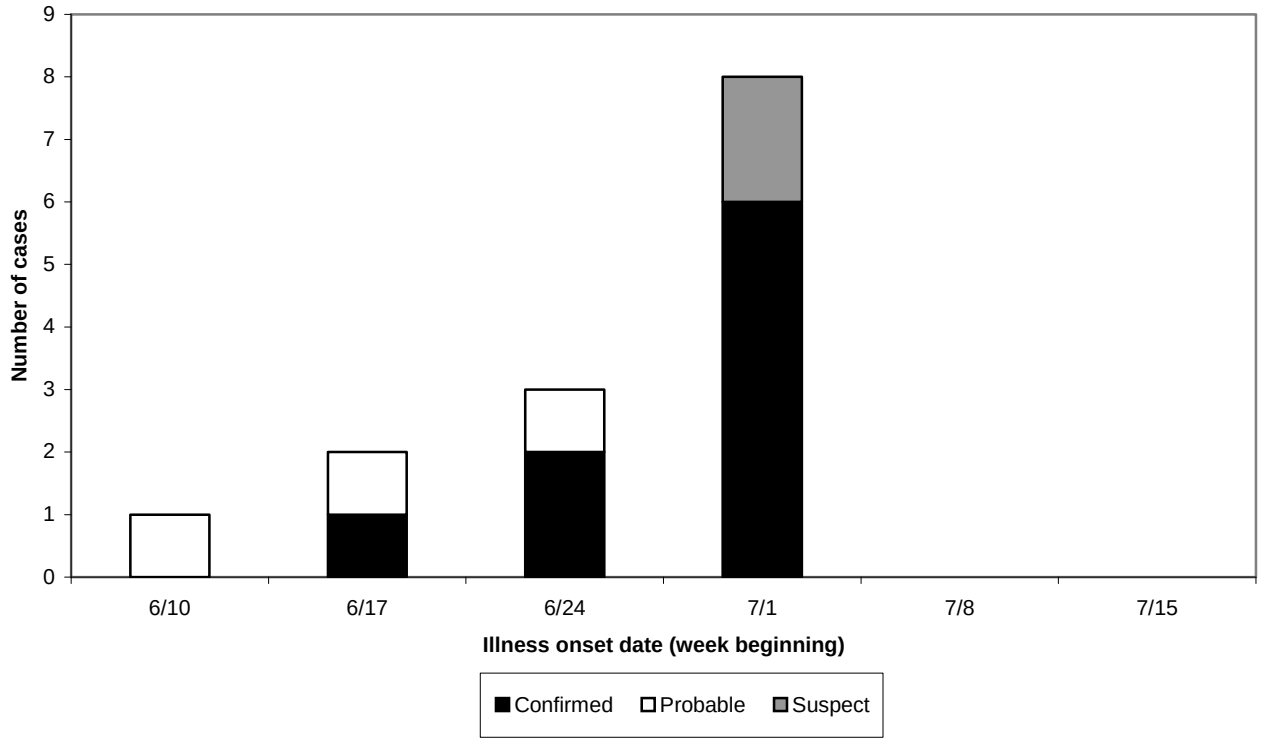

Figure 1. Number of confirmed, probable, and suspect tularemia case-patients by onset date, June-July, 2007

Table 1. Risk and protective factors by case status

	Cases	Non-cases	RR	95% Confidence Interval		p-value
	N (%)	N (%)		Lower Limit	Upper Limit	
Insect bite(s)						
Yes	13 (92.9)	209 (48.2)	13.2*	1.7	100.3	0.001
No	1 (7.1)	225 (51.8)				
Painful bite(s)						
Yes	5 (35.7)	47 (10.8)	4.2*	1.5	12.1	0.004
No	9 (64.3)	387 (89.2)				
Mosquito bite(s)						
Yes	5 (35.7)	185 (42.6)	0.8	0.3	2.2	0.607
No	9 (64.3)	249 (57.4)				
Deer fly bite(s)						
Yes	7 (50.0)	36 (8.3)	9.4*	3.5	25.6	<0.001
No	7 (50.0)	398 (91.7)				
Tick bite(s)						
Yes	0 (0.0)	1 (0.2)	undefined			
No	14 (100.0)	433 (99.8)				
Use repellent						
Yes	11 (78.6)	295 (68.0)	1.7	0.5	6.0	0.402
No	3 (21.4)	139 (32.0)				
Use DEET						
Yes	11 (78.6)	238 (54.8)	2.9	0.8	10.4	0.079
No	3 (21.4)	196 (45.2)				
Use repellent - morning						
Yes	7 (50.0)	179 (41.2)	1.4	0.5	3.9	0.513
No	7 (50.0)	255 (58.8)				
Continued…						

Use repellent - afternoon						
Yes	7 (50.0)	112 (25.8)	2.8*	1.0	7.7	0.044
No	7 (50.0)	322 (74.2)				
Use repellent - evening						
Yes	8 (57.1)	169 (38.9)	2.0	0.7	5.8	0.170
No	6 (42.9)	265 (61.1)				
Use repellent - night						
Yes	6 (42.9)	73 (16.8)	3.5*	1.3	9.8	0.012
No	8 (57.1)	361 (83.2)				
Wear hat						
Yes	11 (78.6)	197 (45.4)	4.2*	1.2	15.0	0.014
No	3 (21.4)	237 (54.6)				
Marsh areas						
Yes	11 (78.6)	251 (57.8)	2.6	0.7	9.2	0.121
No	3 (21.4)	183 (42.2)				
Rough sage brush						
Yes	10 (71.4)	303 (69.8)	1.1	0.3	3.4	0.897
No	4 (28.6)	131 (30.2)				
Rough trails						
Yes	9 (64.3)	238 (54.8)	1.5	0.5	4.3	0.484
No	5 (35.7)	196 (45.2)				
Finished trails						
Yes	10 (71.4)	281 (64.8)	1.3	0.4	4.2	0.606
No	4 (28.6)	153 (35.3)				
Irrigated fields						
Yes	3 (21.4)	79 (18.2)	1.2	0.3	4.3	0.759
No	11 (78.6)	355 (81.8)				
Ponds						
Yes	10 (71.4)	214 (49.3)	2.5	0.8	7.9	0.103
No	4 (28.6)	220 (50.7)				
Hay						
Yes	7 (50.0)	92 (21.2)	3.5*	1.3	9.8	0.011
No	7 (50.0)	342 (78.8)				
Maintained campgrounds						
Yes	10 (71.4)	308 (71.0)	1.0	0.3	3.2	0.970
No	4 (28.6)	126 (29.0)				

*$p<0.05$

B. Environmental Assessment

Desiccated carcasses of 12 rabbits were collected from the area around the lodge; 11 (92%) tested positive for *F. tularensis* by standard PCR; nine could be identified as type A using real-time, multitarget PCR (four Type A1 and one Type A2) and two were identified as Type B. A total of 190 deer flies were collected: 183 identified as *Crysops discalis*, and 7 identified as *C. fluvialis*. No evidence of *F. tularensis* was detected in any of the flies when tested by either culture or PCR assay. Efforts to trap live animals (300 trap-nights) yielded only 5 *Peromyscus maniculatus* and 1 *Dipodornys ordi*. Cultures of blood and spleen from the 6 live, trapped rodents were negative for *F. tularensis*.

VI. Discussion

This tularemia outbreak investigation was multi-jurisdictional and multi-disciplinary, including three concurrent parts: environmental assessment, cohort study, and clinical study. This was a relatively large outbreak involving 14 cases linked to an epizootic among rabbits in a specific geographical area. Tularemia cases have occurred after exposure in this area in past years.

Utah experienced a previous epizootic of tularemia among rabbits in 1971.(5) During a three-month period, 39 persons were diagnosed with and reported to have the disease. Twenty-eight (72%) of these cases were associated with deer fly bites. Other patients were thought to have contracted it from biting gnats or mosquitoes, as they had no recollection of the painful bite that often accompanies deer fly bites. The evidence of transmission via biting gnats or mosquitoes was indirect, as cultures taken from these insects were negative. *F. tularensis* was isolated from both deer flies and rabbits in areas where persons had been infected. The geographic distribution of cases, both where they lived and where they were infected, differed in these two Utah outbreaks. The 1971 outbreak had cases that spanned 11 counties, with the majority occurring in the western half of the state. The 2007 outbreak was localized to a particular area on the west side of Utah Lake.

Two risk factors for disease in the current outbreak were having been bitten by a deer fly and having spent time near the hay barn. The deer fly is a well-known mode of tularemia transmission from wild animal reservoir (rabbit) to humans, although less common than ticks; and inhalation of dust from contaminated soil, grain, or hay is another known mode of transmission [though not previously in Utah].(6) Not all case patients remembered having been bitten by a deer fly, and it is possible that other insects transmitted disease. There was indirect evidence from Utah's 1971 outbreak that mosquitoes (or biting gnats) might be able to transmit the disease.(5) All cases who spent time near the hay barn also reported insect bites.

Wearing insect repellent did not appear to be a protective factor (it was a risk factor), although this finding might be explained in part by potential recall bias. For example, case patients may be more likely to recall protective or risk factors, such as use of insect repellent. Perhaps more importantly, if used appropriately, insect repellant with DEET can be effective against other arthropods that transmit tularemia (i.e., mosquitoes and ticks), but it has not been shown to be effective against deer flies.

This is the first known documentation of multiple subspecies and clades in a localized outbreak, as two subspecies (types A and B) were found in rabbits and two distinct clades (types A1 and A2) were found in both patients and rabbits; these results contrast previous findings of the geographic characteristics and associated vectors of *F. tularensis* subspecies and clades (2, 7).

Limitations of the cohort study include missing information and potential recall bias associated with the long time period that elapsed between respondents' visits to the lodge and questionnaire completion. This time delay was due, in part, to delayed diagnosis of individual patients and, consequently, delayed detection of the outbreak. A limitation of the environmental assessment was the timing of the collection of live animals, insects, and animal carcasses from the exposure location. This occurred approximately three weeks after the onset of human illness and might explain the lack of evidence of *F. tularensis* among deer flies and live rodents.

Although the response rate was relatively good for a study of this type, the study may not have had enough power to find statistically significant differences between those who acquired tularemia (n = 14) and those who did not (n = 434). A formal power test was not conducted.

This investigation marked UDOH's first use of an online questionnaire. Better response was received when paper questionnaires were distributed, especially if distributed by an epidemiologist at a meeting of the targeted cohort. The urgency of the matter was better expressed by having a meeting organized by and with representation from the health department. This meeting also provided an opportunity to distribute public health messages regarding both tularemia and West Nile virus. The web-based questionnaire seemed to be more easily forgotten or disregarded. Most potential participants who were initially provided information to complete the web-based questionnaire had to be contacted a number of times, and

eventually were given the paper questionnaire. This created a time delay and might have contributed to recall bias.

[Other issues included misdiagnoses from physicians, refusal of blood work, and emotional issues for the patients. Some of the patients were very upset by the diagnosis of tularemia and some still had symptoms at the time of this report. A few cases refused follow-up blood work because they wanted to put this behind them and move on. Some of the cases had gone to the media and reported "Brown Recluse" spider bites, which was only one of the many diagnosesthat were given before the correct diagnosis of tularemia (others included, for example, cellulitis and MRSA). See clinical study report for more information.]

Lessons learned include the recognition that the outbreak required collaboration between state and local public health departments, physicians at area hospitals, Utah Public Health Laboratory, Utah Department of Agriculture and Food -- Division of Wildlife Resources, and CDC. The importance of public health is exemplified in this outbreak of a disease of low prevalence in a high-risk area. Public health was necessary to recognize the outbreak after physicians recognized disease.

VII. Conclusion

Available evidence suggests this was a naturally occurring cluster. Since tularemia naturally occurring in Utah, the medical community should have amplified awareness of the disease, its signs and symptoms, and treatment. An increased index of suspicion for tularemia during summer months, especially when the patient has spent time doing outdoor activities such as trekking, camping, or hunting, is warranted. This should be promoted through an educational campaign among the medical community. Public health professionals could distribute information to physicians, clinics, urgent cares, emergency rooms and laboratories in June, when summer begins and temperatures begin to rise. The public should be educated to avoid bites of ticks, flies, and mosquitoes and proper use of insect repellant. Proper use of insect repellant specific to deer flies should also be addressed. Education, including distribution of educational materials, for leaders of groups planning to spend time outdoors (e.g., church leaders, Boy Scout leaders, summer camp leaders, and wilderness survival and recreational groups) would be appropriate. These messages are important not only for tularemia, but also for other diseases, such as disease associated with West Nile virus infection. For example, certain prevention messages (wearing long sleeves and pants and wearing insect repellant with DEET to protect against mosquitoes and ticks) are similar for tularemia and West Nile virus, and perhaps some portion of the education campaigns for these diseases could be combined.

References

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3. Versage et al. [need full reference from CDC Fort Collins]

4. Kugeler et al. [need full reference from CDC Fort Collins]

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7. Petersen, J.M., Carlson, J.K., Dietrich, G., Eisen, R.J., Coombs, J., Janusz, A.M., Summers, J., Beard, C.B., Mead, P.S. Identification of multiple *F. tularensis* subspecies and clades during a focal outbreak of tularemia, Utah 2007. (Submitted)

Appendix A

Line list

Onset Date	Age (yrs)	Sex	Health District	Hospitalized?	Status	Type
6/15/2007	13	F	UCHD	NO	Probable	A
6/22/2007	20	F	DCHD	NO	Probable	A
6/23/2007	49	F	UCHD	NO	Confirmed	A
6/28/2007	37	M	SLVHD	NO	Probable	A
6/29/2007	14	M	SLVHD	YES	Confirmed	A
6/29/2007	17	F	SLVHD	YES	Confirmed	A
7/1/2007	16	M	SLVHD	YES	Confirmed	A
7/1/2007	60	M	SLVHD	NO	Confirmed	A
7/1/2007	7	F	UCHD	YES	Confirmed	
7/2/2007	49	M	SLVHD	YES	Confirmed	A
7/2/2007	16	M	UCHD	YES	Confirmed	A
7/5/2007	77	M	UCHD	NO	Confirmed	A
7/5/2007	1	M	SWUPH	NO	Suspect	
7/5/2007	47	F	WMHD	NO	Suspect	

Appendix B

Utah Department of Health Tularemia Investigation Form

Suspect tularemia case investigation form
Utah July 2007

Demographics:

Last name:_____ First name:_____

Date of birth: _____/_____/_____

Age (years): _____ Gender : M F Unk

Race: _____ Ethnicity: _____

_____ _____ _____ _____
Street address City State Zipcode

_____
County

(_____) _____-_____
Phone number

Reporting information:

Reported by: _____

Reported date: _____/_____/_____

Clinical Information:

Onset date: _____/_____/_____

Clinician name: _____

Clinician phone (_____) _____-_____

Was patient hospitalized? Y N Unk

Did patient die? Y N Unk

Is patient currently symptomatic? Y N Unk

If yes, please indicate which symptoms apply:

- Swollen, pus-filled lymph nodes Y N Unk
- Conjunctivitis Y N Unk
- Pharyngitis Y N Unk
- Abdominal pain Y N Unk
- Diarrhea Y N Unk
- Vomiting Y N Unk
- Cough Y N Unk
- Difficulty breathing/ chest pain Y N Unk
- Gastrointestinal bleeding Y N Unk
- Skin ulcer Y N Unk
- Fatigue Y N Unk
- Fever Y N Unk
- Malaise Y N Unk

Laboratory Information:

*Test requested:	Laboratory performing test:	Sample type:	Date sample collected:	Results:	Test date:

(Test may include: culture, IgG (acute or convalescent), IgM (acute or convalescent)

Exposure history:

Did the patient report the following during the 14 days before onset of symptoms?

Tick bite: Y N Unk
If yes, list city and state of exposure: _____

Deer fly bite: Y N Unk
If yes, list city and state of exposure: _____

Travel in U.S. but outside of Utah: Y N Unk
If yes, list locations: _____

Travel outside of U.S.: Y N Unk
If yes, list locations: _____

Exposure to the following animals (alive or dead):

- Dog Y N Unk
- Cat Y N Unk

- Rabbit Y N Unk
- Other wildlife Y N Unk

If yes to any of the above, please list where the exposure occurred (city, state) and if the animal was dead or appeared to be ill:

Type of animal	City, state of exposure	Was the animal dead?	Was the animal ill?

Did the patient consume any meat from game animals? Y N Unk
If yes, please specify date(s) of consumption and type(s) of animal(s):

_____

_____

Bioterrorism Information:

Did this patient have an appropriate exposure for the disease to be naturally occurring?

Y N Unk

Did this patient have an appropriate exposure for the disease to be naturally occurring?

Y N Unk

Is the disease presentation (symptoms) typical? Y N Unk

Was the patient previously healthy? Y N Unk

Is the antibiotic resistance profile typical for this organism? Y N Unk

Is the patient responding to therapy? Y N Unk

Is this an appropriate time of year for the disease to occur? Y N Unk

Has agriculture been called to see if there is a concurrent outbreak in animals?

Y N Unk

Has active surveillance been initiated to see if other (unreported) cases have occurred?

Y N Unk

Notes or additional information:

Appendix C

Tularemia Cohort Questionnaire

Health officials are investigating an outbreak of the disease "tularemia" near Utah Lake. The goal of this investigation is to keep more people from getting sick. As part of the investigation, we are asking you to complete the following survey.

Instructions:

- This survey is for people who visited or stayed at the Mosida Lodge & Wildlife Refuge and surrounding areas between June 10 and July 20, 2007. It asks simple questions about what you did there, whether you had insect bites, and whether you became ill.
- The survey should take about 5 minutes to complete. Your answers are helpful even if you did not get sick.
- Parents or guardians should complete the survey for children age 11 or younger. Teenagers age 12 to 17 should get their parents permission before completing this survey (and their help if needed to answer all questions).

---

1. Name _____
   First Last

2. Age ___ years
   - If you are 12-17, check here to indicate that you have your parent's permission to complete this questionnaire → □
   - If 11 or younger, who is completing this form: (check one)
     □Parent
     □Other_____

3. Sex (check one)
   □ Male
   □ Female

4. Did you (your child) visit or stay at Mosida Lodge & Wildlife Refuge and surrounding areas between June 10 and July 20
   □ Yes
   □ No → Stop, do not complete this survey

5. How many days were you there? ____ days

6. What group were you with? _____

7. What were you there for?
   □ Trek
   □ Youth Group

□ Family reunion
□ Young Adult Group
□ Other (what_____)

8. Were you a group leader?
□ Yes □ No □ Unsure

9. Did you sleep one or more nights in the bunkhouse?
□ Yes □ No □ Unsure

10. Did you sleep one or more nights in the lodge?
□ Yes □ No □ Unsure

11. Did you sleep one or more nights in any of the following (check all that apply):
□campers, □tents, □out in the open (under the stars)

12. During your stay, did you do any of the following activities *(need info on activities patients report doing when bitten)?*

Volleyball……	□ Yes	□ No	□ Unsure
Dairy tour……	□ Yes	□ No	□ Unsure
Horse shoes……	□ Yes	□ No	□ Unsure
Explore trails……	□ Yes	□ No	□ Unsure
Square dancing……	□ Yes	□ No	□ Unsure

13. During your stay, did you get any insect bites (don't include tick bites in your answer)?
□ Yes □ No □ Unsure

If yes, were any of these bites especially painful at the time (worse than a mosquito bite) □
Yes □ No □ Unsure

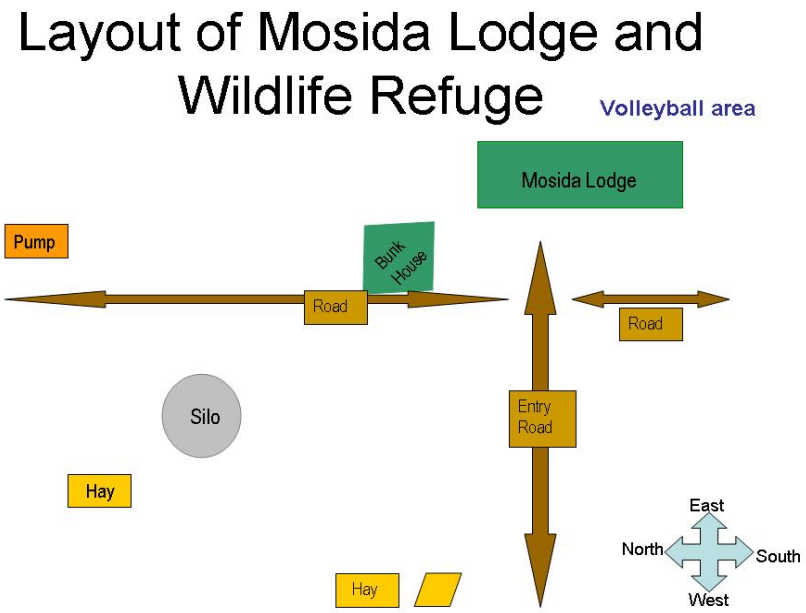
If yes,

a. How many total especially painful bites do you remember getting during your stay? (check one)
□1 □2-3
□4-6 □7 or more

b. What time(s) of day did you get these especially painful bite(s)? (check all that apply)
□morning □afternoon
□evening □night

c. Where on your body were you bitten? (check all that apply)

□arm/hand □leg/foot
□face/head □back/chest
□neck □other (_____)
□unsure



d. Where were you when you were bitten? (check all that apply)

□ Near the lodge/Nauvoo/Elm Grove Park (includes the volley ball court, swings, bunkhouse, bathrooms)
□ On the trail near the Lookout tower, Martin's Cove, or Inspiration Point
□ On the trail near Rocky Ridge
□ On the trail near Women's Pull
□ On the trail near Liberty Pole
□ On the trail near Winter Quarters
□ On the trail near Missionary House
□ On the trail but don't remember where
□ By the water pump/pond
□ Silo

14. The next question asks about bites by specific types of insects. During your stay, were you bitten or stung by any:

Mosquitoes…… □ Yes □ No □ Unsure

Gnats or "no-see-ums" …….	□ Yes	□ No	□ Unsure
Deer flies……...	□ Yes	□ No	□ Unsure
Horse flies…….	□ Yes	□ No	□ Unsure
Wasps…….....	□ Yes	□ No	□ Unsure
Ants……...	□ Yes	□ No	□ Unsure
Spiders……...	□ Yes	□ No	□ Unsure
Biting flies (uncertain type)…	□ Yes	□ No	□ Unsure

15. During your stay or within a few days afterwards, did you find or remove any ticks that had attached or embedded into your skin?

□ Yes □ No □ Unsure

↓

If yes, how many attached ticks did you find? _____ ticks

16. During your stay, did you use any insect repellent on your skin?

□ Yes □ No □ Unsure

↓

If yes,

a. On the days you used repellant, about how many times each day did you apply it?

□1 □2 □3 □4 or more

b. What times of day did you apply it (check all that apply)

□morning □afternoon
□evening □night

c. Did the repellent contain "DEET"?

□ Yes □ No □ Unsure

d. Did the repellent contain picaridin?

□ Yes □ No □ Unsure

17. During your stay, did you use any special insect repellent made just for clothes (not skin)?

□ Yes □ No □ Unsure

18. During your stay, what best describes the clothing you usually wore in the daytime (morning through evening) during your stay?

a. Top length (choose one)…….. □Short sleeves □Long sleeves □Unsure

b. Top color (choose one)…… □Light colored □Dark colored □Unsure

c. Bottom length (choose one)…... □Shorts/knee length skirt
□Long pants/ankle length skirt

□Unsure

d. Bottom color (choose one)…….□Light colored □Dark colored □Unsure

e. Hat/Bonnet ……□Yes □No

19. During your stay, did you:

See any live rabbits……□ Yes □ No □ Unsure
See any dead rabbits……. □ Yes □ No □ Unsure
Touch live animals…….□ Yes □ No □ Unsure
If yes, please specify: _____
Touch any dead animals…… □ Yes □ No □ Unsure
If yes, please specify: _____
Take your dog with you……..□Yes □ No □ Unsure
If yes, did your dog become ill?
□ Yes □ No □ Unsure

20. During your stay, were you:

Licked by any dogs……..… □ Yes □ No □ Unsure
Bitten by any animals…… □ Yes □ No □ Unsure
If yes, please specify: _____

21. Prior to your visit, were you on any of the following antibiotics: □ Yes □No
If yes, please specify:
□Tetracyclines (Tetracycline, Minocycline, Doxycycline)
□Fluoroquinolones (Ciprofloxacin, Levofloxacin)

22. Within the 14 days after being at Mosida, did you develop any of the following:

Fever……..…..… □ Yes □ No □ Unsure
Chills ……..……. □ Yes □ No □ Unsure
Headache……...…... □ Yes □ No □ Unsure
Extreme fatigue…… □ Yes □ No □ Unsure
Loss of appetite……...□ Yes □ No □ Unsure
Red, painful eyes…….. □ Yes □ No □ Unsure
Sore throat……..….. □ Yes □ No □ Unsure
Swollen lymph nodes…..... □ Yes □ No □ Unsure
Cough……... □ Yes □ No □ Unsure
Chest pain…….……... □ Yes □ No □ Unsure
Vomiting……..…..... □ Yes □ No □ Unsure
Stomach pain……... □ Yes □ No □ Unsure
Diarrhea……... □ Yes □ No □ Unsure
Skin sores or ulcers (other than blisters from your shoes!)……..
□ Yes □ No □ Unsure
Mouth sores (not related to dental work)
□ Yes □ No □ Unsure

<u>If yes to any of the above</u>, please answer:

a. Did any of these symptoms last more than 3 days?
□ Yes □ No □ Unsure

23. Were you around corralled horses, cows or sheep?
□ Yes □ No □ Unsure

24. Check all that apply. During your visit were you in or around: □marsh areas, □rough sage brush, □rough trails, □finished trails, □irrigated fields, □ponds, □hay or □maintained camping grounds?

25. If you would like to receive feedback/results from this study, please provide us with your mailing address.

_____

_____

_____

This is the end of the survey.

Thank you!

Appendix D

CLINICAL MANIFESTATIONS QUESTIONNAIRE

Date_____ Interviewer_____

Name: _____ ID: _____
LAST *FIRST*

Address / Apt: _____

City: _____ County: _____ Zip Code: _____

Telephone: (Home)_____ (Work)_____ (Other)_____

Birth Date: _____ / _____ / _____ Age: _____ Sex: M F

Parent or Contact Person: _____

Occupation: _____

Race: White Black Asian Pacific Islander Native American Unknown Other

Ethnicity: Hispanic Non–Hispanic

1. Within the 2-3 weeks after being exposed, did you develop any of the following: (If Yes, please include duration of symptoms in days.)

Fever	□ Yes _____Days	□ No	□ Unsure
Chills	□ Yes _____Days	□ No	□ Unsure
Night sweats	□ Yes _____Days	□ No	□ Unsure
Lethargy/Weakness	□ Yes _____Days	□ No	□ Unsure
Headache	□ Yes _____Days	□ No	□ Unsure
Neck pain	□ Yes _____Days	□ No	□ Unsure
Red eyes	□ Yes _____Days	□ No	□ Unsure
Painful eyes	□ Yes _____Days	□ No	□ Unsure
Eye discharge	□ Yes _____Days	□ No	□ Unsure
Change in vision	□ Yes _____Days	□ No	□ Unsure
Sore throat	□ Yes _____Days	□ No	□ Unsure
Mouth sores	□ Yes _____Days	□ No	□ Unsure
Swollen lymph nodes-neck	□ Yes _____Days	□ No	□ Unsure
Cough	□ Yes _____Days	□ No	□ Unsure
Runny nose/Nasal Congestion	□ Yes _____Days	□ No	□ Unsure
Chest pain	□ Yes _____Days	□ No	□ Unsure
Swollen lymph nodes-arm pit	□ Yes _____Days	□ No	□ Unsure
Vomiting	□ Yes _____Days	□ No	□ Unsure
Stomach pain	□ Yes _____Days	□ No	□ Unsure
Diarrhea	□ Yes _____Days	□ No	□ Unsure
Constipation	□ Yes _____Days	□ No	□ Unsure
Pain with urination	□ Yes _____Days	□ No	□ Unsure
Poor appetite	□ Yes _____Days	□ No	□ Unsure
Swollen lymph nodes-groin	□ Yes _____Days	□ No	□ Unsure
Sore muscles	□ Yes _____Days	□ No	□ Unsure
Joint swelling	□ Yes _____Days	□ No	□ Unsure
Joint redness	□ Yes _____Days	□ No	□ Unsure
Other symptom (Please describe)_____		_____Days	

2. Did you have skin sores or ulcers?

□ Yes □ No □ Unsure

If yes, please describe where and how many:

Head/neck	□ Yes	_____Lesions	□ No	□ Unsure
Upper arms	□ Yes	_____Lesions	□ No	□ Unsure
Lower arms	□ Yes	_____Lesions	□ No	□ Unsure
Hands	□ Yes	_____Lesions	□ No	□ Unsure
Trunk	□ Yes	_____Lesions	□ No	□ Unsure
Upper legs	□ Yes	_____Lesions	□ No	□ Unsure
Lower legs	□ Yes	_____Lesions	□ No	□ Unsure
Feet	□ Yes	_____Lesions	□ No	□ Unsure

The following questions are related to all of the healthcare visits you had related to being diagnosed with possible Tularemia, including visits where IV antibiotics were administered.

3. First Healthcare Visit:

a. Health Care Provider:
- □ Primary Care Office
- □ Urgent Care
- □ Emergency Room
- □ Infectious Diseases Clinic
- □ Dermatology Clinic
- □ Other _____

b. Visit Date_____

c. Place of Visit:_____

d. Admitted:
□ Yes _____Days □ No □ Unsure

Hospital_____

e. Antibiotics:
□ Yes □ No □ Unsure

If yes, which of the following antibiotics were used: (Please check all that were prescribed during this Visit and taken up until next Visit. Write in the number of days and route that each were taken.)

□ Amoxicillin (Amoxil)	____Days	□ PO	□Unsure			
□ Amox/Clav (Augmentin)	____Days	□ PO	□Unsure			
□ Azithromycin (Zithromax)	____Days	□ IV	□ PO	□Unsure		
□ Ceftriaxone (Rocephin)	____Days	□ IV	□ IM	□Unsure		
□ Cephalexin (Keflex)	____Days	□ PO	□Unsure			
□ Ciprofloxacin (Cipro)	____Days	□ IV	□ PO	□Unsure		
□ Clindamycin (Cleocin)	____Days	□ IV	□ PO	□Unsure		
□ Doxycycline (Vibramycin)	____Days	□ IV	□ PO	□Unsure		
□ Gentamicin (Garamycin)	____Days	□ IV	□ PO	□ IM	□Unsure	
□ Levofloxacin (Levaquin)	____Days	□ IV	□ PO	□Unsure		
□ Linezolid (Zyvoxx)	____Days	□ IV	□ PO	□Unsure		
□ Trimethoprim/Sulfa (Septra)	____Days	□ IV	□ PO	□Unsure		
□ Vancomycin (Vancocyn)	____Days	□ IV	□Unsure			
□ Other_____	____Days	□ IV	□ PO	□ IM	□Unsure	

f. Laboratory: (Obtained in conjunction with this visit)

WBC	_____	ESR	_____	ALT	_____
HGB	_____	CRP	_____	AST	_____
HCT	_____	Na	_____	Prot	_____
PLT	_____	K	_____	Alb	_____
Segs	_____	Cl	_____	Bili	_____
Bands	_____	HCO3	_____	AlkP	_____
Lymph	_____	BUN	_____	CK	_____

Mono _____ Cr _____ CKMB _____
Eos _____ Gluc _____ Ca _____

g. Microbiology: (Obtained in conjunction with this visit)
Tularemia Cx (wound) □ Pos □ Neg
Tularemia Cx (blood) □ Pos □ Neg
Tularemia Cx (CSF) □ Pos □ Neg

Tularemia PCR (wound) □ Pos □ Neg
Tularemia PCR (blood) □ Pos □ Neg

Tularemia DFA (wound) □ Pos □ Neg

Tularemia serology Acute _____ Convalescent _____

h. Other labs obtained:
EBV
Serology □ Pos □ Neg
Monospot (rapid test) □ Pos □ Neg

CMV □ Pos □ Neg

HIV □ Pos □ Neg

Routine culture:
Source:_____ Result:_____

Rapid Strep □ Pos □ Neg

Biopsy:
Source:_____ Result:_____

Other (not listed above):_____

Other (not listed above):_____

i. Radiology: (Obtained in conjunction with this visit)
Chest Xray Findings:_____

MRI Findings:_____

CT Findings:_____

Angiogram Findings:_____

Echo Findings:_____

4. Second Healthcare Visit:

j. Health Care Provider:
□ Primary Care Office
□ Urgent Care
□ Emergency Room
□ Infectious Diseases Clinic
□ Dermatology Clinic
□ Other _____

k. Visit Date_____

l. Place of Visit:_____

m. Admitted:

□ Yes _____Days □ No □ Unsure

Hospital_____

n. Antibiotics:

□ Yes □ No □ Unsure

If yes, which of the following antibiotics were used: (Please check all that were prescribed during this Visit and taken up until next Visit. Write in the number of days and route that each were taken.)

□ Amoxicillin (Amoxil)	____Days	□ PO	□Unsure			
□ Amox/Clav (Augmentin)	____Days	□ PO	□Unsure			
□ Azithromycin (Zithromax)	____Days	□ IV	□ PO	□Unsure		
□ Ceftriaxone (Rocephin)	____Days	□ IV	□ IM	□Unsure		
□ Cephalexin (Keflex)	____Days	□ PO	□Unsure			
□ Ciprofloxacin (Cipro)	____Days	□ IV	□ PO	□Unsure		
□ Clindamycin (Cleocin)	____Days	□ IV	□ PO	□Unsure		
□ Doxycycline (Vibramycin)	____Days	□ IV	□ PO	□Unsure		
□ Gentamicin (Garamycin)	____Days	□ IV	□ PO	□ IM	□Unsure	
□ Levofloxacin (Levaquin)	____Days	□ IV	□ PO	□Unsure		
□ Linezolid (Zyvoxx)	____Days	□ IV	□ PO	□Unsure		
□ Trimethoprim/Sulfa (Septra)	____Days	□ IV	□ PO	□Unsure		
□ Vancomycin (Vancocyn)	____Days	□ IV	□Unsure			
□ Other_____	____Days	□ IV	□ PO	□ IM	□Unsure	

o. Laboratory: (Obtained in conjunction with this visit)

WBC _____	ESR _____	ALT _____
HGB _____	CRP _____	AST _____
HCT _____	Na _____	Prot _____
PLT _____	K _____	Alb _____
Segs _____	Cl _____	Bili _____
Bands _____	HCO3 _____	AlkP _____
Lymph _____	BUN _____	CK _____
Mono _____	Cr _____	CKMB _____
Eos _____	Gluc _____	Ca _____

p. Microbiology: (Obtained in conjunction with this visit)

Tularemia Cx (wound)	□ Pos	□ Neg
Tularemia Cx (blood)	□ Pos	□ Neg
Tularemia Cx (CSF)	□ Pos	□ Neg
Tularemia PCR (wound)	□ Pos	□ Neg
Tularemia PCR (blood)	□ Pos	□ Neg
Tularemia DFA (wound)	□ Pos	□ Neg

Tularemia serology Acute _____ Convalescent _____

q. Other labs obtained:

EBV

Serology □ Pos □ Neg
Monospot (rapid test) □ Pos □ Neg

CMV □ Pos □ Neg

HIV □ Pos □ Neg

Routine culture:
Source:_____ Result:_____

Rapid Strep □ Pos □ Neg

Biopsy:
Source:_____ Result:_____

Other (not listed above):_____

Other (not listed above):_____

r. Radiology: (Obtained in conjunction with this visit)

Chest Xray Findings:_____

MRI Findings:_____

CT Findings:_____

Angiogram Findings:_____

Echo Findings:_____

5. Third Healthcare Visit:

s. Health Care Provider:
- □ Primary Care Office
- □ Urgent Care
- □ Emergency Room
- □ Infectious Diseases Clinic
- □ Dermatology Clinic
- □ Other _____

t. Visit Date_____

u. Place of Visit:_____

v. Admitted:
□ Yes _____Days □ No □ Unsure

Hospital_____

w. Antibiotics:
□ Yes □ No □ Unsure

If yes, which of the following antibiotics were used: (Please check all that were prescribed during this Visit and taken up until next Visit. Write in the number of days and route that each were taken.)

□ Amoxicillin (Amoxil)	____Days	□ PO	□Unsure			
□ Amox/Clav (Augmentin)	____Days	□ PO	□Unsure			
□ Azithromycin (Zithromax)	____Days	□ IV	□ PO	□Unsure		
□ Ceftriaxone (Rocephin)	____Days	□ IV	□ IM	□Unsure		
□ Cephalexin (Keflex)	____Days	□ PO	□Unsure			
□ Ciprofloxacin (Cipro)	____Days	□ IV	□ PO	□Unsure		
□ Clindamycin (Cleocin)	____Days	□ IV	□ PO	□Unsure		
□ Doxycycline (Vibramycin)	____Days	□ IV	□ PO	□Unsure		
□ Gentamicin (Garamycin)	____Days	□ IV	□ PO	□ IM	□Unsure	
□ Levofloxacin (Levaquin)	____Days	□ IV	□ PO	□Unsure		
□ Linezolid (Zyvoxx)	____Days	□ IV	□ PO	□Unsure		
□ Trimethoprim/Sulfa (Septra)	____Days	□ IV	□ PO	□Unsure		
□ Vancomycin (Vancocyn)	____Days	□ IV	□Unsure			
□ Other_____	____Days	□ IV	□ PO	□ IM	□Unsure	

x. Laboratory: (Obtained in conjunction with this visit)

WBC	_____	ESR	_____	ALT	_____
HGB	_____	CRP	_____	AST	_____
HCT	_____	Na	_____	Prot	_____
PLT	_____	K	_____	Alb	_____
Segs	_____	Cl	_____	Bili	_____
Bands	_____	HCO3	_____	AlkP	_____
Lymph	_____	BUN	_____	CK	_____
Mono	_____	Cr	_____	CKMB	_____
Eos	_____	Gluc	_____	Ca	_____

y. Microbiology: (Obtained in conjunction with this visit)

Tularemia Cx (wound)	□ Pos	□ Neg
Tularemia Cx (blood)	□ Pos	□ Neg
Tularemia Cx (CSF)	□ Pos	□ Neg
Tularemia PCR (wound)	□ Pos	□ Neg
Tularemia PCR (blood)	□ Pos	□ Neg
Tularemia DFA (wound)	□ Pos	□ Neg

Tularemia serology Acute _____ Convalescent _____

z. Other labs obtained:

EBV

Serology	□ Pos	□ Neg
Monospot (rapid test)	□ Pos	□ Neg

CMV □ Pos □ Neg

HIV □ Pos □ Neg

Routine culture:

Source:_____ Result:_____

Rapid Strep □ Pos □ Neg

Biopsy:
Source:_____ Result:_____

Other (not listed above):_____

Other (not listed above):_____

aa. Radiology: (Obtained in conjunction with this visit)

Chest Xray Findings:_____

MRI Findings:_____

CT Findings:_____

Angiogram Findings:_____

Echo Findings:_____

6. Fourth Healthcare Visit:

bb. Health Care Provider:
- □ Primary Care Office
- □ Urgent Care
- □ Emergency Room
- □ Infectious Diseases Clinic
- □ Dermatology Clinic
- □ Other _____

cc. Visit Date_____

dd. Place of Visit:_____

ee. Admitted:
□ Yes _____Days □ No □ Unsure

Hospital_____

ff. Antibiotics:
□ Yes □ No □ Unsure

If yes, which of the following antibiotics were used: (Please check all that were prescribed during this Visit and taken up until next Visit. Write in the number of days and route that each were taken.)

□ Amoxicillin (Amoxil)	____Days	□ PO	□Unsure	
□ Amox/Clav (Augmentin)	____Days	□ PO	□Unsure	
□ Azithromycin (Zithromax)	____Days	□ IV	□ PO	□Unsure
□ Ceftriaxone (Rocephin)	____Days	□ IV	□ IM	□Unsure

□ Cephalexin (Keflex)	____Days	□ PO	□Unsure			
□ Ciprofloxacin (Cipro)	____Days	□ IV	□ PO	□Unsure		
□ Clindamycin (Cleocin)	____Days	□ IV	□ PO	□Unsure		
□ Doxycycline (Vibramycin)	____Days	□ IV	□ PO	□Unsure		
□ Gentamicin (Garamycin)	____Days	□ IV	□ PO	□ IM	□Unsure	
□ Levofloxacin (Levaquin)	____Days	□ IV	□ PO	□Unsure		
□ Linezolid (Zyvoxx)	____Days	□ IV	□ PO	□Unsure		
□ Trimethoprim/Sulfa (Septra)	____Days	□ IV	□ PO	□Unsure		
□ Vancomycin (Vancocyn)	____Days	□ IV	□Unsure			
□ Other_____	____Days	□ IV	□ PO	□ IM	□Unsure	

gg. Laboratory: (Obtained in conjunction with this visit)

WBC _____	ESR _____	ALT _____
HGB _____	CRP _____	AST _____
HCT _____	Na _____	Prot _____
PLT _____	K _____	Alb _____
Segs _____	Cl _____	Bili _____
Bands _____	HCO3 _____	AlkP _____
Lymph _____	BUN _____	CK _____
Mono _____	Cr _____	CKMB _____
Eos _____	Gluc _____	Ca _____

hh. Microbiology: (Obtained in conjunction with this visit)

Tularemia Cx (wound)	□ Pos	□ Neg
Tularemia Cx (blood)	□ Pos	□ Neg
Tularemia Cx (CSF)	□ Pos	□ Neg
Tularemia PCR (wound)	□ Pos	□ Neg
Tularemia PCR (blood)	□ Pos	□ Neg
Tularemia DFA (wound)	□ Pos	□ Neg

Tularemia serology Acute _____ Convalescent _____

ii. Other labs obtained:

EBV

Serology	□ Pos	□ Neg
Monospot (rapid test)	□ Pos	□ Neg

CMV □ Pos □ Neg

HIV □ Pos □ Neg

Routine culture:
Source:_____ Result:_____

Rapid Strep □ Pos □ Neg

Biopsy:
Source:_____ Result:_____

Other (not listed above):_____

Other (not listed above):_____

jj. Radiology: (Obtained in conjunction with this visit)

Chest Xray Findings:_____

MRI Findings:_____

CT Findings:_____

Angiogram Findings:_____

Echo Findings:_____

If more than 4 visits please fill out additional visit sheets

7. Complications:

_____
_____
_____
_____
_____

(Possibilities include: pneumonia, lymph node suppuration, septicemia, meningitis, endocarditis, hepatitis, renal failure, DIC, acute respiratory distress, erythema nodosum, erythema multiforme, etc.)

a. How many days were you unable to go about your usual activity? _____
b. Can you estimate how much the total medical cost (including prescriptions and any other medical costs from healthcare visits and/or hospitalizations)? _____